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ABSTRACT

This learning packet contains information about the Wright Brothers, Wilbur and Orville. The packet highlights certain facts that will help students understand the Wright Brothers' contributions in the field of manned flight in a heavier-than-air machine. It includes poster sheets (artwork) and task cards to be used by students and a booklet to assist the teachers. When used as a visual display, the packet's poster sheets will provide information and motivation as the students complete the task cards. The 20 task cards are study and activities cards. Each card provides information and instructions for completing a related activity. Subjects covered in the task cards include mathematics, science, reading, geography, health, language, speech, spelling, social studies, music, art, values clarification, and careers. The teacher's booklet includes a recommended teaching method and a short text that covers the life of Wilbur and Orville Wright. It contains a materials list, suggestions for evaluating student activities, a test with a test key, an aerospace education achievement award, a student record sheet, and sheets of poster art. (BT)

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Wilbur and Orville Wright
Curriculum Guide [and] Activity Booklet

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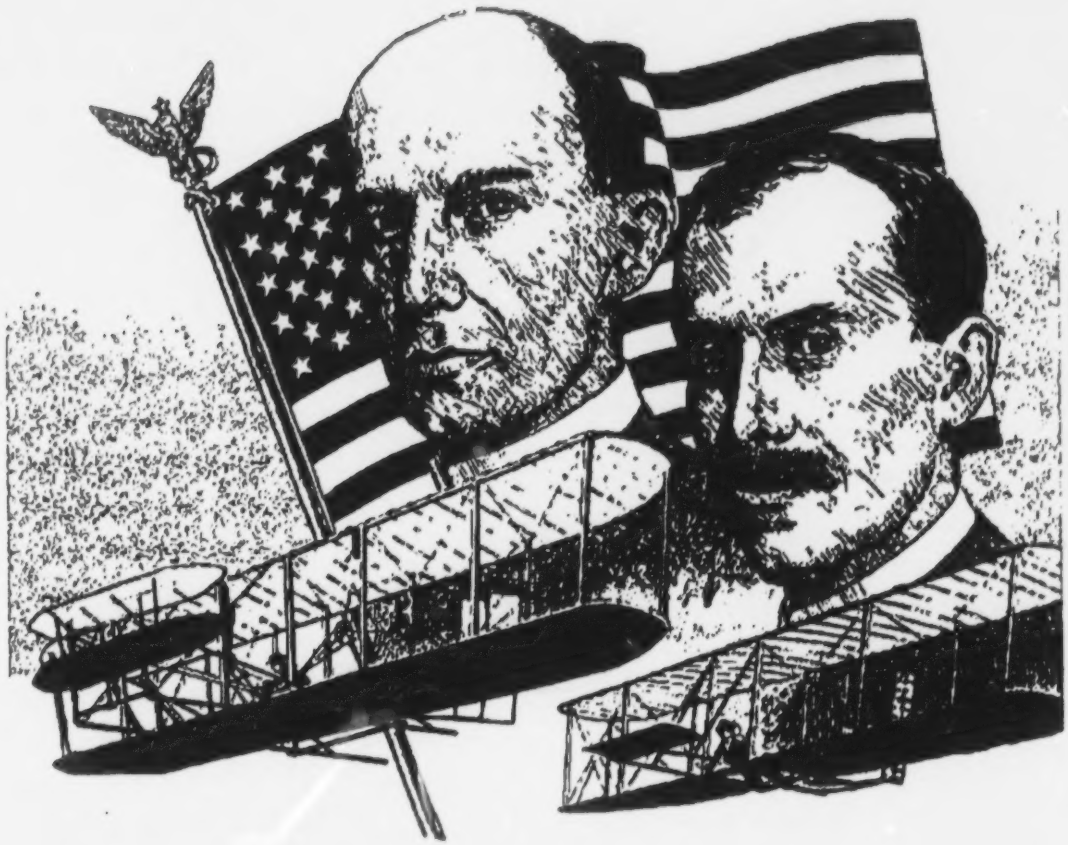
Wilbur and Orville
WRIGHT



Curriculum Guide

Federal Aviation Administration
800 Independence Avenue, S.W.
Washington, DC 20591
General Information: 202-366-4000
Hearing Impaired TTY (Hours 9:00am-5:30pm): 202-755-7687
http://www.faa.gov/education/index.htm

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INTRODUCTION

Since World War II, there has been a need to provide classroom teachers with materials to aid them in teaching about the aerospace world. One area needing such materials is the study of aerospace personalities-the people who moved us from Kitty Hawk to the Sea of Tranquility and beyond. The feats of individuals that have made history in this or in any other field are often, at best, misunderstood and then soon ignored or forgotten after the first notoriety has been achieved.

This learning packet contains information about the Wright brothers. We want this packet to point out certain facts that will develop an understanding of the Wright brothers' contributions in the field of manned flight in a heavier-than-air machine. The Wright brothers succeeded in controlled, powered heavier-than- air flight because of a combination of factors. First, they had access to the knowledge gained by others before them; sound, the first practical power plant-the gasoline engine-had been developed; and finally, they were highly creative, possessed outstanding mechanical aptitude, and were endowed with a great deal of personal integrity. They approached the task of manned flight in a methodical scientific manner. Using wind tunnels and unmanned flight tests, they developed the first aircraft that would fly and could be controlled. Then they added a power plant of their own design. The result was the Flyer, which changed mankind from a two-dimensional creature to one of three dimensions. The world would never be the same. Wilbur and Orville's contributions didn't stop there. They provided an inspiration to airmen throughout the world and remained active in aviation for the rest of their lives.

Understanding any subject requires knowledge of the terminology and structure associated with the subject. A background of the subject's origin and subsequent development is also required. This packet on the Wright brothers provides information in narrative form, and students will experience reinforcement of their knowledge as they complete the various task cards and study the accompanying visual displays.

We have compiled this packet to include poster (artwork) and task cards to be used by the students and a booklet to assist the teachers. When used as a visual display, the posters will capture the students' attention and will provide information and motivation as they complete the task cards. The task cards are study and activities cards. Each card provides information and instructions for completing a related activity. There are 20 task cards. Subjects covered in the task cards include mathematics, science, reading, geography, health, language, speech, spelling, social studies, music, art, values clarification, and careers. These nonsequential enrichment activities free you from additional research.

The teacher's booklet includes a recommended teaching method, and a short text that covers the life of Wilbur and Orville Wright. Also, there is a materials list, suggestions for evaluating student activities, a test with a test key, an aerospace education achievement award, a student record sheet, and sheets of poster art.

The recommended teaching method is a list of steps you can take to guide your students down the path toward successful completion of the entire learning packet. It is only one route. You, of course, may diverge from the path in any way you see fit and use your academic discretion in any way you want to arrive at the desired learning outcome. The materials list tells you what is required to complete each of the tasks. This list will allow you to gather all the materials necessary for the activities. A list of suggestions is provided which you may find useful in evaluating the work done by your students as they progress through the tasks.

Also included in the booklet is a test and the test key. If you wish, you may use this evaluation tool as a pretest before the students begin work on their first task. After all tasks have been finished, it may be used again as a posttest to identify gained knowledge. Use your discretion-if you use the test, a block is provided on the student record sheet for the scores and dates administered.

The blank aerospace education achievement award may be copied on the school's duplicating machine and used at your discretion. The student's record sheets give you and your students a record of their progress through the packet. Students will enter start and finish dates for each of the tasks and will, in return, expect your initialed acceptance of that work in the block provided for your initials plus any comments necessary. Notice the spaces for entry of pretest/posttest scores at the bottom of the sheet.

TEACHING METHOD

PREPARATION:

- Cut each task card along the dashed line and glue each to a piece of card stock.
  - A student may accomplish this job.
  - The cards will last longer if they are laminated in plastic.
- Provide materials and supplies in a designated place.
  - Materials list is included.

- Display the enclosed posters (artwork) on a bulletin board where they will be visible and can serve as a source of information.

- Make two tagboard packets and label them SELECT and FINISRED.

  -With this organization, there is less chance of loss. Also, you can quickly see if the cards are being used.

- Write or type the following directions on a 3 x 5 card and tack it between the two-tagboard packets:

DIRECTIONS	AFTER YOU HAVE FINISHED EACH TASK
1. Take a task card from the SELECT packet. 2. Enter the date on your record sheet when you start the task.	1. Enter the date on your record sheet. 2. Place your finished work in your folder. 3. Place the task card in the FINISHED packet.

- Prepare a personalized folder for each student.

- Provide a copy of the student record sheet.

PRESENTATION:

- Introduce the bulletin board materials.

  - Explain the information that is provided as part of the display.

- Instruct the students on:

  - The text.

  - How to use the task cards.

  - Where the materials are located.

- Instruct the students to select the task cards in the order of their choice. or assign task cards yourself.

- Hand out personalized folders and copies of students' record sheets.

  - Explain how to fill out the record sheets.

  - Assign a location for the folders.

- Administer the pretest before the students begin their activities.

  - The test key is included.

  - Record the scores on the students' record sheets.

- Tell students when you will meet again.

NOTE: If small groups will be doing the tasks, it is beneficial to have heterogeneous groups with a stronger reader assigned to a weaker reader.

EVALUATION

- Have students bring in their folders during individualized instruction or reading time, conference time, or at some other acceptable time.

- Go over assignments, and initial students' record sheets.

  - Unacceptable work should be returned for re-accomplishment, completion, or proofreading; make an appropriate comment on the students' record sheet.

- Meet with small groups to evaluate, and schedule future plans (skits, etc.). The folder should be initialed when acceptable.

  - Students may monitor and accept assignments, but only with your permission.

- Administer the posttest and record the scores on the students' record sheets.

- Award a completed copy of the Aerospace Education Achievement Award to students who have satisfactorily completed the activities given on the task cards and who have shown a gain in knowledge of the Wright brothers.

WILBUR AND ORVILLE WRIGHT'S BACKGROUND

Biography

The parents of the famous Wright brothers were Milton and Susan Catherine Koerner Wright. Milton Wright was a minister who later became a bishop in the United Brethren in Christ Church and his wife was a well-educated woman. Wilbur was born near Richmond, Indiana, in 1867, and Orville was born in Dayton, Ohio, in 1871. The family moved often because of the father's profession. The Wright family allowed freedom of expression. The children were taught to be self-sufficient and emphasis was placed on learning. In 1885, Orville completed high school. In the fall of that same year, Wilbur was to enter Yale; however, while playing a game called "shinny," he suffered a severe facial injury that kept him from entering the university. Because of his injury, Wilbur was inactive for several years. He devoted this time to looking after his mother, Susan Wright, who had become ill with tuberculosis. She died on July 4, 1889.

Early Businessmen

Orville went into the printing business with a friend, printing handbills, tickets, and other small jobs. In 1889, Wilbur joined them and they began publishing the West Side News, a small four-page newspaper. Their printing venture lasted until 1896. During this time, they published the Evening Item and their most successful publication, a weekly magazine called Snapshots. In 1892, the Wright brothers became bicycle manufactures to capitalize on the bicycle "craze"sweeping the nation. Their company produced two models-the "Van Cleve" and the "Wright Flyer."

Interest in Flight

When Orville was 7 and Wilbur was 11 years old, their father gave them a toy helicopter which was "powered" by two counterrotating propellers and it actually flew. This was the beginning of their interest in flight. Kites also fascinated the brothers and they built and flew them, even as adults. Between 1891 and 1899, the Wrights read everything they could find about flight. They closely followed the gliding exploits of Otto Lilien thal and read the published material of such aviation pioneers as Samuel Pierpont Langely and Octave Chanute. They particularly liked what they found in Chanute's works. The more they studied, the more interested they became in building and flying their own aircraft.

The Wrights decided the best glider design would be a biplane, or "double-decker," as Chanute called it. The brothers knew their biggest problem would be in maintaining equilibrium. The Wrights calculated that movable surfaces were the answer to equilibrium problems and proceeded to work out the design for their first glider.

They were also looking for a place to perform flight tests and Kitty Hawk, North Carolina, was selected as the location. This was not a random selection; the methodical Wrights had looked for a place with fairly constant wind and Kitty Hawk most nearly answered this requirement.

INTO THE AIR

Nonpowered Flight/Gliders

The Wright brothers' first aircraft was flown as a kite with movable surfaces manipulated from the ground by long control lines. The next, a larger version of the first, was flown first as a kite and later with a pilot aboard. The craft was difficult to manipulate and did not fly well. Nevertheless, the brothers were enthusiastic about the results and reached the following conclusions during the first test flights.

- Practice is the key to the secret of flying.
- Drag or wind resistance can be reduced by the

In July 1901, they returned to Kitty Hawk with their new, much larger glider. Things didn't go well. The control system worked, but the craft performed poorly and the maximum glide distance attained was only 389 feet. Chanute observed these flights and he and the Wrights concluded the problem was with the tables of air pressure (on an airfoil) which had been worked out by Lilienthal. The Wrights were discouraged. However, the encouragement of Chanute coupled with their interest and innate curiosity motivated them to continue to study and approach the problem scientifically.

pilot assuming a horizontal position.

- Up and down motion can be controlled by adding a smaller wing, set at a negative angle in front of the main wings
- Side-to-side motion can be controlled by wing-warping (presenting different angles of the wing-ends to the wind).

During the winter of 1901-1902, they built a wind tunnel to test airfoils and recomputed pressure tables. The results of their research and tests gave them the inspiration to continue their "hobby," and to build a new glider. The 1902 glider had been modified to maximum lift, optimum controllability, and a rudder added to the rear of the craft. This time it performed well, gliding a distance of 622 feet. They knew they had solved the problem of manned flight, and at this point the brothers became very secretive about their work.

Powered Flight

On March 23, 1903, the Wright brothers applied for patents for their flight control system. They were confident that a motor (or engine) could be added for sustained flight. Attempts at finding a suitable commercial motor failed so the Wrights and C. E. Taylor, a machinist from their bicycle shop, constructed a lightweight, four-cyclinder engine. This engine produced twelve horsepower. The next task was to design propellers for the craft. After much experimentation, their final design consisted of two counterrotating propellers of the "pusher" type.

On September 23, 1903, the Wrights once again left Dayton for Kitty Hawk. Only three weeks were required to assemble their craft but the flights were delayed due to mechanical problems and bad weather. While they waited for the weather to clear, the Wrights devised instruments for their craft-an anemometer to gauge the speed of the "relative wind," a stopwatch to measure the time airborne, and a counting device to measure the revolutions made by the propellers.

On December 17, 1903, at 10:35 in the morning, with J. T. Daniels, W. S. Dough, A. D. Ethridge, W. C. Brinkley, and Johnny Moore as witnesses, Orville got on the machine for an attempt at flight. The wind velocity was averaging about 24 miles per hour. With throttle "forward," the craft left the rail when it was about 40 feet down the 60-foot track. With the wind slightly gusty and the front rudder (elevator) erratic in its operation, Orville's flight was made like a roller coaster ride. However, the flight from level ground to level ground covered 120 feet in about 12 seconds and was the first successful sustained and controlled powered flight in history. Three additional flights were made that same day. The second and third flight each covered approximately 175 feet, and the fourth and final flight of the day covered 859 feet in 59 seconds. The rough landing damaged the front rudder frame and while "parked" at the hangar for repairs, a sudden gust of wind caught the craft, turned it over, and demolished it. There was nothing left to do but go home.

The Wrights wanted wide news coverage of their feat but were disappointed when the press was indifferent and newspaper accounts were brief and inaccurate.

The Wright brothers' second powered aircraft was completed about May 16, 1904. It was heavier and stronger than the 1903 craft and had a more powerful engine. They invited the press and public to witness their demonstration flights at Huffman Prairie. Nothing went well. The winds were too light, they had motor trouble, and the craft simply did not get into the air. Although they corrected the problems and made longer and longer flights, public interest was lacking.

In 1905, the new "Flyer" was airborne. This plane had a tendency to slip and stall in the turns but they found the problem was one of piloting technique rather than faulty design and construction. Promoters wanted to buy the plane as a moneymaking, circus type attraction, and representatives from several European countries were also interested in purchasing the plane. The Wrights wanted the United States to have first chance at their invention so they wrote the Secretary of War offering the plane for sale. The offer was refused. Then, they began negotiations with foreign countries but these failed because of patent troubles and their "buy-now, fly- later" attitude.

Fame

Between October 1905, and February 1908, the Wright brothers did no flying. They were afraid that spies would steal their invention, so they kept it hidden from public view. In February 1908, they finally signed a contract with the United States Army, and in March of that year they negotiated a contract with a French company. They developed a new aircraft called the "Type A." Wilbur took one to France to demonstrate it while Orville tested one for the Army. On September 17, 1908, during the last test flight for the Army, the plane developed propeller troubles and crashed killing Lieutenant T. E. Selfridge and breaking Orville's leg. However, this accident did not deter the Army's interest in the plane and the contract was fulfilled. In 1909 and 1910, Europe and America were intensely interested in flying. During this time, the Wrights were involved in many legal battles defending their patents. They won major judgments against early aviators and aircraft manufacturers.

INTO HISTORY

The Wright brothers produced new, modified models of their plane. These models had the elevator and rudder mounted at the rear and wheels permanently attached to their skids. Wilbur and Orville also taught many people to fly and these new "instructor pilots" went on to teach others. The Wright brothers gained fame and financial success. By 1911 everything was going well for them. Their factory was producing aircraft at capacity, and they had sold their patent rights to France and Italy. Then, in May 1912, Wilbur was stricken with typhoid fever. He died on May 30, 1912. Orville continued working. His inventions included the "automatic stabilizer" and several more models of their aircraft. In 1915, he sold the patents held by the Wright Company but continued to work in his private laboratory. Orville lived the remaining years of his life in financial security and peace. He died in January of 1948.

MATERIALS LIST

TASK 1. None.
TASK 2. Paper and pencil.
TASK 3. Paper and pencil
TASK 4. None.
TASK 5. None.
TASK 6. Paper and pencil
TASK 7. Paper and pencil.
TASK 8. Construction paper, material scraps, burlap, yarn, and crayons.
TASK 9. Paper, pencil, and kite materials
TASK 10. Paper and pencil.
TASK 11. Paper and pencil.
TASK 12. Paper and pencil.
TASK 13. String, tempera paint, construction paper, potatoes, knife, and sponges.
TASK 14. Paper and pencil.
TASK 15. Paper and pencil.
TASK 16. Paper and pencil.
TASK 17. Paper and pencil.
TASK 18. Paper and pencil.
TASK 19. Paper and pencil.
TASK 20. Paper, pencil, and construction paper.

NOTE: This materials list assumes access to a library, and the availability of dictionaries and encyclopedias.

TEST

1 . **The Wright brothers' father was a**

a. doctor
b. lawyer.
c. printer.
d. minister.

2. **The Wright brothers had**

a. doctor
b. lawyer.
c. printer.
d. minister.

3. **Because of Milton's job, the Wright family**

a. had money for experimenting.
b. was able to attend special schools.
c. traveled extensively around Europe.
d. moved frequently in the children's younger years.

4. **Wilbur Wright**

a. was younger than Orville and died first.
b. was younger than Orville and outlived him
c. was four years older than Orville and died first.
d. was two and one half years older than Orville and outlived him.

5. **After an accident playing "shinny,"**

10. **The first powered flight was flown by**

a. Orville on July 4,1776..
b. Wilbur on December 17, 1871
c. Orville on December 17, 1903.
d. Wilbur and Orville on December 17, 1913.

11. **The Wright brothers built or invented**

a. bicycles, airplanes, gliders, and cars.
b. engines, bicycles, and a sewing machine.
c. bicycles, gliders, airplanes, and engines.
d. kites, stoves, mandolins, and a printing press.

12. **The Wright brothers lived most of their lives in**

a. Dayton, Ohio, and traveled during their inventive years.
b. Columbus, Ohio, and traveled through the United States and Europe.
c. Indianapolis, Indiana, but made many trips to Kitty Hawk, North Carolina.
d. Kitty Hawk, North Carolina, and traveled to Washington, D.C., and Europe.

13. **The Wright brothers**

a. knew only success.
b. depended on others, especially newspaper men.
c. could sew and read, and worked for the Weather Bureau.
d. had many crashes but their worst injury was Orville's broken leg.

14. **Which expression BEST fits the Wright brothers?**

a. Orville began printing handbills.
b. Wilbur had to give up racing bikes.
c. Orville broke his leg and couldn't ride his bike.
d. Wilbur lost eight teeth and was ill for a long time.

6. **The Wright brothers lived in the following states:**

a. Indiana, Iowa, and Ohio.
b. Iowa, Missouri, Ohio, and Tennessee.
c. Indiana, Kentucky, Nebraska, and Ohio.
d. Indiana, Michigan, Ohio, and Wisconsin.

7. **Which statement is the MOST informative about the Wright brothers?**

a. Orville played the mandolin and Wilbur read
b. They succeeded in building a flying machine while others failed.
c. They had difficulty reaching Kitty Hawk because there were no bridges and few inhabitants.
d. They began building bikes, experimenting with flight, overcoming failures, and became world- famous inventors.

8. **Which words do NOT make us think of the Wright brothers?**

a. Kites, gliders, and airplanes.
b. Jets, airports, airlines, and jet lag.
c. Printing press, bicycles, and motor patents.
d. Wind tunnel, experiments, failures, and success.

9. **Pick the FALSE statement. The Wright brothers**

a. Nothing succeeds like success.
b. All work makes Jack a dull boy.
c. A penny saved is a penny earned.
d. If at first you don't succeed, try, try again.

15. **Who helped most in seeing that each Wright brother became successful?**

a. Newspapermen.
b. The other brother.
c. Royalty from Europe.
d. The United States Government.

16. **In which of the following countries did the Wright brothers try to sell their airplanes?**

a. Spain.
b. Canada.
c. France.
d. Russia.

a. died in poverty.
b. wanted to sell their airplane.
c. were successful in their bicycle business.
d. studied and read the works of other men and learned from them.

15

TEST KEY

1.	d	9.	a
2.	d	10.	C
3.	d	11.	C
4.	C	12.	a
5.	d	13.	d
6.	a	14.	d
7.	d	15.	b
8.	b	16.	C

STUDENT RECORD SHEET

THE WRIGHT BROTHERS
BY

_____
(STUDENT'S NAME)

	Started	Finished	Comments	Initials
TASK 1 - Language (Speaking)				
TASK 2 - Values Clarification				
TASK 3 - Science				
TASK 4 - Language				
TASK 5 - Language				
TASK 6 - Reading				
TASK 7 - Reading				
TASK 8 - Art				
TASK 9 - Science				
TASK 10 - Mathematics				
TASK 11 - Mathematics				
TASK 12 - Careers				
TASK 13 - Art				
TASK 14 - Language				
TASK 15 - Music				
TASK 16 - Geography				
TASK 17 - Social Studies				
TASK 18 - Health				
TASK 19 - Spelling				
TASK 20 - Art				

Pretest Score: **Date:** **Postest Score:** **Date:**

STUDENT TASK CARDS

TASK 1 - LANGUAGE (SPEAKING)

In 1909, Orville and his sister Katherine went to France to watch Wilbur give exhibition flights. King Alfonso of Spain, King Edward VII of England, and enthusiastic crowds also watched Wilbur.

The Wrights received medals in Paris, France and London, England, and from President Taft at the White House. Officers in the state of Ohio and the city of Dayton also gave awards.

Pretend you are to present a medal to the Wrights. If you are from France or England, you may want to try an accent. Your speech should last one to two minutes. Tell how they started with bicycles; about there experiments, goals, and disappointments; and why they are being honored by your country, state, or city.

AFTER YOU HAVE GIVEN YOUR SPEECH, DATE YOUR RECORD SHEET.

TASK 2- VALUES CLARIFICATION

At an early age, the Wright brothers earned their own spending money. Their mother paid them one cent or each dish washed and hired them to make minor repairs around the house. Orville folded papers and junk gathered to sell. One successful project was a neighborhood circus. Wilbur wrote advance notices, which attracted so many people that they had to have two performances.

It isn't easy for young people to earn money. Find two other people and try brainstorming together. Try to hink up at least ten simple, unusual, and wild ways in which you all could earn money. List silly ideas and build upon them. Combining two ideas may develop one super new idea.

Later, you will want to compare your list with other groups. You may combine ideas and be the richest students in your school!

AFTER YOU HAVE PLACED YOUR LIST IN YOUR FOLDER, DATE YOUR RECORD SHEET. ALSO, EACH MEMBER OF THE GROUP DATE YOUR RECORD SHEET.

TASK 3-SCIENCE

The Wright brothers asked the United States Weather Bureau for bulletins on wind speed at various locations throughout the nation. They were working on a glider and needed an area with flat open country, sand hills, and free from shrubs. They chose Kitty Hawk, North Carolina, and wrote the weather bureau there for details. The informative replies they received convinced them that Kitty Hawk was the right place for their experiments.

Choose one of the following:

1. Write the United States Weather Bureau and ask for bulletins on weather for two locations. You should know someone living in one of the places.

2. Write the United States Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Washington, D.C. 20233 and ask for pamphlets on tornadoes and hurricanes.

3. Using an encyclopedia or a book on weather, find out how the Bureau uses kites and balloons for the study of weather and the atmosphere. Write a report on your findings.

PLACE A COPY OF YOUR LETTER OR REPORT IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 4- LANGUAGE

Several events in the Wright brothers' lives might be fun to act out in a skit. Form a group of not more than five people and prepare a skit dealing with one of the situations below. If your group wants to act out some other event, ask your teacher for approval.

1. The adult Wrights are flying kites and gliders near Dayton. Several onlookers think they are crackpots. Others think that eventually people will fly.

2. The Wrights repaired and raced bicycles. The winners of these races were paid money. They built a bike to race but lost in their first attempt. They won later races. Could you demonstrate two different races?

AFTER YOU HAVE COMPLETED YOUR SKIT, DATE YOUR RECORD SHEET. ALSO, EACH MEMBER OF THE GROUP DATE YOUR RECORD SHEET.

TASK 5- LANGUAGE

The Wrights went to Kitty Hawk to assemble and test their new flying machine. On December 14, 1903, by tossing a coin, Wilbur won the privilege of being the first pilot.

Create a news broadcast for use on the TV News for one of the following:

1. Five people watch the brothers toss a coin to see who will be the first to fly. Wilbur wins. The flight is a 3½-second hop.
2. Wilbur gives exhibition flights in France and sets a world flight record of 1½ hours.
3. Orville and Lieutenant Selfridge crash while testing a plane for the Army. Lieutenant Selfridge is killed and Orville receives a broken leg and cracked ribs.

AFTER YOU HAVE COMPLETED YOUR TV BROADCAST, DATE YOUR RECORD SHEET. ALSO, EACH MEMBER OF THE GROUP DATE YOUR RECORD SHEET.

TASK 6- READING

The Wright family had two groups of books in their home. The father's serious books were upstairs. The family's books, which the boys liked best, were downstairs. Wilbur and Orville read constantly. Wilbur was the more serious reader.

Some of the books they read were Grimm's and Andersen's Fairy Tales, Washington Irving's works, and a set of the Encyclopedia Britannica of the late 1880s. They especially liked the scientific articles.

Choose one of the authors to read about or one of the author's stories to read. Write five facts about the author and what kinds of stories he wrote. Write the main idea of the story and write one statement about a character that you liked.

PLACE YOUR COMPLETED WORK IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 7- READING

As young men, the Wright brothers were inquisitive, persistent, and patient. After growing up, they remained avid readers and discussed scientific theories and errors they discovered in their designs and tests.

Other people had tried, and were still trying, to invent flying machines. During those hazardous days, many pathfinders perished in crashes. Some kept records, gave lectures, and had scientific or engineering training. Wilbur and Orville were self-taught scientists who read about other people's ideas and used their mechanical talents and ingenuity to build a lightweight engine.

They gained knowledge by conducting experiments in a wind tunnel. As a result of three years' labor, the Wright brothers proved manned flight was possible.

The newspaper accounts were insignificant. Some people thought these obscure brothers had created a carnival attraction. Once the Wright brothers flew, they applied their insatiable minds to developing another superior machine.

Look up in your dictionary at least eight of the italicized words. Write the word, the meaning, and your own sentence containing the word.

PLACE YOUR COMPLETED WORK IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 8- ART

The Wright brothers used a sewing machine to sew together pieces of cloth to cover the wings of their glider. After they were finished with the glider, Mrs. Tate of Kitty Hawk used the fabric to make her daughter's dresses.

Choose one of the following to do:

1. Draw a glider on construction paper and use scraps of material to cover your design.
2. Make a small scrapbook of cloth samples, which you think would make interesting or useful overings for wings.
3. Using burlap and yarn, make a small stitchery of a glider. Outline the glider and fill it in with different yarn stitchings.

AFTER DISPLAYING YOUR WORK, DATE YOUR RECORD SHEET.

TASK 9-SCIENCE

Orville was an expert at making kites. He sold them to playmates for spending money. The framework of his kites was so thin that it bent in the wind. At ten, Orville did not realize that this curvature contributed greatly to the kite's good flying qualities.

Wilbur and Orville's curiosity about flight was aroused at an early age when their father gave them a toy helicopter. In 1899, they built a biplane kite with wings that could be moved forward and backward with sticks. They also added an elevator, which was very much like those that planes use today.

Mr. Leslie Hunt is the author to the book "25 Kites That Fly," which was published in 1964 by the Bruce Publishing Company, Milwaukee, Wisconsin. He writes about kite making in general, gives flying hints, and tells how to make plane-surface kites, tailless kites, and compound kites. Borrow Mr. Hunt's book from your library and do the following:

1. Make one of the kites he describes.
2. Fly your kite and write a short report on how you feel when you fly it.
3. Draw a collection of five different designs of kites.
4. Write three rules for safe kite flying.

PLACE YOUR REPORT, DRAWINGS, AND LIST OF RULES IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 10-MATHEMATICS

On Thursday, December 17, 1903, at 10:35 a.m., Orville Wright made the first powered flight. At 11:20 a.m., Wilbur Wright made the second flight.

Wilbur Wright was 5 feet and 10 inches tall and weighed 140 pounds. Qrville Wright was shorter by an inch and a half and was 5 pounds heavier.

Wilbur died in May 1912, and Orville died in January 1948.

Answer the following questions:

1. How much time passed between the two flights?
2. How many years did Orville outlive Wilbur?
3. Compare your height and weight to Orville's. Which is greater?
4. Rank Orville's and Wilbur's height and weight with yours from shortest to tallest and lightest to heaviest.

AFTER PLACING YOUR WORK IN YOUR FOLDING, DATE YOUR RECORD SHEET.

TASK 11 - MATHEMATICS

Wilbur and Orville's first successful airplane flight covered a distance of 120 feet in 12 seconds. An Air Force bomber-the B-52-has a wingspan of 180 feet and weighs 500,000 pounds.

A Wright Company plane purchased in 1912 would have cost $5,000.

A Piper Cub purchased today would cost over $20,000.

The Wright brothers' heaviest glider weighed 116 pounds.

Answer the following questions.

1. How much longer is the wingspan of a B-52 than the distance of the Wright brothers' first flight?
2. How much heavier is the B-52 than the glider?
3. What is the difference in cost between the Wright Company 1912 plane and a Piper Cub flying today?
4. If Orville had continued flying 120 feet every 12 seconds, how many feet would he have covered in a minute? How many yards is this?
5. If an airliner flies 550 miles per hour, how far can it fly in 2½ hours?

PLACE YOUR COMPLETED WORK IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 12- CAREERS

The Wright brothers' father was a minister. Orville skipped school at the beginning of his kindergarten year. His teacher and mother finally discovered where he was playing. Wilbur needed the help of a dentist because of his accident. An orthodontist, dental hygienist, dental assistant, or dental laboratory technician could help today.

For a time, Wilbur and Orville were printers. Then they became merchants and operated their bicycle shop. interested in flight, they read about Chanute, a structural engineer. Newspaper reporters did not give the initial flights of the Wright brothers much coverage.

Select one of the italicized professions, which interest you and find out as much about it as you can. Write a summary of your findings.

PLACE YOUR SUMMARY IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 13- ART

Orville Wright began printing handbills for grocers. Later, both Wilbur and Orville published a weekly paper called "The West Side News" because Orville wanted to try out a printing press he had built. Paul Lawrence Dunbar, a famous black poet, had the Wrights print "The Tattler," a paper he wrote for the black community.

There are other ways to print besides using a printing press. Do one of the following:

1. String printing-Use various lengths of string, tempera paint, and construction paper. Dip the string into paint, squeeze off excess paint with fingers, and arrange the string in a design on the paper. Lay a second piece of paper over the string and press down. Use a second string and a different color paint. Let a piece of this string hang out between the two papers and pull out for second design painting.

2. Potato printing-Use a knife to carve designs into half of a raw potato, dip design in tempera, and press on construction paper.

3. Sponge painting-Cut sponge in different shapes, dip in tempera, and press on paper.

AFTER YOU DISPLAY YOUR WORK, DATE YOUR RECORD SHEET.

TASK 14- LANGUAGE

An acrostic is a poem in which the first letter of each line forms a name or message. Wright might read:

Wind tunnel,
Reading, observations,
Interviewed Chanute,
Gliders, kites,
Heights possible,
Today.

Create a poem or message using Orville or Wilbur, or make a different acrostic for Wright.

PLACE YOUR COMPLETED WORK IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 15- MUSIC

Wilbur and Orville traveled by boat to reach Kitty Hawk because there were no bridges connecting the beach with the North Carolina mainland. Orville looked after the bicycle shop, while Wilbur took glider parts to Kitty Hawk. Wilbur's task was more challenging.

They set up a camp which some local people thought was dangerous because they used a gasoline stove. They had few visitors except for the Tate family and a mocking bird. The bird would occasionally join in harmony while Orville played on his mandolin.

Do one of the following:

1. Use an encyclopedia or book on musical instruments to find out about the mandolin. Write a summary of your findings.
2. Using a book of musical terms or dictionary, define harmony.
3. Try to harmonize with someone or write a few measures of harmony.

PLACE YOUR COMPLETED WORK IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 16- GEOGRAPHY

Wilbur Wright was born in Indiana in 1867 and Orville Wright was born four years later in Ohio. Their father was a minister in the United Brethren in Christ Church and the family moved wherever Reverend Wright's job led him. In 1877, the Wrights moved to Iowa. The next move led them back to Indiana and, finally, in 1884 the family returned to Dayton, Ohio.

The Wright brothers went to Kitty Hawk, North Carolina, for experimenting. Later, as businessmen, they sought sales of their invention in France, Germany, Austria, Italy, and England.

Do one of the following:

1. Find the capital of each italicized state and country. Write both the city and state (or country) on your paper.
2. Interview five classmates and five adults to find out if they have been to the italicized state and country. Place C for classmate and A for adult beside each city visited. Tally your findings.
3. Locate each italicized state and country and it's capital city on a map.

PLACE YOUR FINDINGS IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 17- SOCIAL STUDIES

Wilbur and Orville Wright had two older brothers and a younger sister. None of the Wright children were given a middle name. Both Wilbur and Orville were named after churchmen.

Learning about our names is fun. Our surname is our last or family name. In many foreign countries the first name is the surname.

Do one of the following:

1. Using a book on names, find the meaning of your name and the names of four of your classmates. In what country did the names originate?
2. Using an encyclopedia, find out how family names began. Write a short paragraph about how your last name may have evolved.
3. Discover the names of three family members who were alive in 1867 and 1871 when the Wright brothers were born.
4. Discover the names of three family members who were alive in 1903 when the Wright brothers made their first flight.

PLACE YOUR FINDINGS IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 18- HEALTH

Wilbur Wright liked to play football and a game called "shinny" which is like ice hockey but is played on land. While playing this game, he was hit in the mouth with a wooden club. He lost five teeth and was unable to eat because his mouth was so sore. Later, three more teeth had to be taken out.

Wilbur's unfortunate accident makes us realize the importance of our teeth.

Do one of the following:

1. Make a list of at least ten causes of dental injuries. Write five ways to prevent these injuries.
2. Using a health book, find why it is important to have dental care for primary or baby teeth although children lose them. Write a summary of your findings.
3. List ten foods containing either calcium or vitamins C, D, or A which are important in a good diet for dental health.

PLACE YOUR FINDINGS IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 19-SPELLING

The following list of words deal with airplane and flying:

1. aileron
2. airfoil
3. airspeed
4. altimeter
5. bank
6. ceiling
7. canopy
8. controls
9. drag
10. drift
11. elevator
12. flap
13. fuselage
14. ground speed
15. inclinometer
16. jet propulsion
17. payload
18. rudder
19. runway
20. spin
21. supersonic
22. taxi
23. throttle
24. turbulence

Do the following:

Select 15 of the words that you wish to study and give your selection to your teacher (keeping a list for yourself).
Using a dictionary, write a brief description beside each word.
Study the spelling and meaning of your words.
When you are ready, have the person giving you the test state the meaning of each word.
You should then write the word correctly.

PLACE YOUR COMPLETED WORK IN YOUR FOLDER. DATE YOUR RECORD SHEET.

TASK 20-ART

Wilbur and Orville Wright used information sent to them by the United States Weather Bureau. The Weather Bureau has flags which have special weather meanings such as hurricane, gale, southwest storm, etc.

Do the following:

1. Using an encyclopedia or weather book, locate the Weather Bureau's flags.
2. Make your own examples of the flags by drawing them on construction paper.
3. Display your drawings.

Additionally, you may wish to use an old white sheet, red and black paint, and sticks to make usable flags for your class.

AFTER DISPLAYING YOUR WORK, DATE YOUR RECORD SHEET.

SUGGESTIONS FOR EVALUATING STUDENT ACTIVITES

TASK 1-LANGUAGE (SPEAKING)
Speech should contain some background on the Wright brothers followed by the presentation of medal

TASK 2-VALUES CLARIFICATION
List should have at least ten ways to earn money. Be alert for unique and creative ideas and comment accordingly on the student's record sheet.

TASK 3-SCIENCE
Letters should have at least an introductory statement and a clearly stated request for the information.

TASK 4-LANGUAGE
Observe skit and comment on creativity if present in performance.

TASK 5-LANGUAGE
Observe TV broadcast and comment on creativity.

TASK 6-READING
Report should contain facts about the authors Grimm, Anderson, or Irving, or about their stories. Evalute report on depth of work done by student.

TASK 7-READING

Definitions for:

TASK 8-ART
Evaluate creativity.

TASK 9-SCIENCE
Report should contain description of kite flying. Drawings should be at least five recognizably different designs of kites. List of three safety rules. Comment on quality of kite if you have the opportunity to see it.

TASK 10-MATHEMATICS

1. 11:20 Wilbur's flight
   -10:35 Orville's flight
   = :45 difference

2. 1948 Orville
   1912 Wilbur
   36

3 and 4. Check accuracy of the facts presented.

TASK 11-MATHEMATICS

1. 180 B-52 wing
   -120 First Flight
   = 60 Wing is longer

2. 500,000 B-52 wing
   - 116 Glider weight
   =499,884 B-52 is heavier.

3. $20,000 Piper Cub
   - 5,000 Wright's 1912 plane
   =$15,000 Difference in cost

4. Minute / 12 Seconds = 60 / 12 = 5

   5 X 120 feet = 600 feet covered in a minute.

   600 / 3 = 200 yds covered in a minute.

5. Speed X time = distance

   $550 \times 2^{1/2}$ = 1,375 miles.

TASK 12-CAREERS
Summary of chosen career should include as much information as possible.

Inquisitive	Given to examination or Investigation. Curious
Persistent.	Continuing or inclined to persist in a course. Steadfast.
Patient.	Steadfast despite opposition, difficulty, or adversity.
Avid.	Characterized by enthusiasm and vigorous pursuit. Eager.
Hazardous.	Involving or exposing one to risk. Dangerous.
Pathfinders.	One that discovers a way. Innovators.
Lectures.	To deliver a lecture.
Ingenuity.	Speeches. Skill or cleverness in devising or combining. Creativeness.
Conducting	The act, manner, or process of carrying on. Doing.
Labor.	Expenditure of physical or mental effort Work
Insignificant.	Not worth considering. Unimportant.
Obscure.	Not readily understood or not clearly expressed. Dim.
Insatiable.	Incapable of being
Superior.	satisfied. Excellent of its kind.

Webster's New Collegiate Dictionary

TASK 13-ART
Evaluate creativity.

TASK 14-LANGUAGE
Consider creativity.

TASK 15-MUSIC

Summary should include a brief description of a mandolin and some history. Webster's New Collegiate Dictionary defines harmony as: 1. Tuneful sound, 2. The combinations of simultaneous musical notes in a chord, 2b. the structure of music with respect to the composition and progression of chords. 2c. The science of the structure, relation, and progression of chords.

TASK 16-GEOGRAPHY

Indianapolis, Indiana
Columbus, Ohio
Des Moines, Iowa
Raleigh, North Carolina
Paris, France
East Berlin, (East) Germany
Bonn, (West) Germany
Vienna, Austria
Rome, Italy
London, England

TASK 17-SOCIAL STUDIES

Findings will include one of the following:

1. A list of five names with meanings and country of origin.
2. A short paragraph on how the student's family name began.
3. A list of three family members who were alive in 1867 and 1871.
4. A list of three family members who were alive in 1903.

TASK 18-HEALTH

Findings will include one of the following:

1. List of 10 causes of dental injuries and 5 ways to prevent them.
2. Summary of research on why dental care is important.
3. List of 10 foods containing calcium or vitamins C, D, or A.

TASK 19-SPELLING

Aileron	Hinged flange on trailing edge of the wing for raising or lowering the wing in flight.
Airfoil	A surface shaped to produce lift.
Airspeed	Actual speed of plane through the air.
Altimeter	Instrument that indicates change of height.
Bank	Position of plane properly tilted to prevent skidding in a turn.
Ceiling	Distance from the ground to the bottom layer of clouds.
Canopy	The transparent enclosure over an airplane cockpit.
Controls	Means of moving rudder, ailerons, and elevator.
Drag	Opposite of thrust; force acting on plane.
Drift	. Angling of plane caused by crosswind.
Elevator	Ringed airfoil at tail to direct plane up and down
Flap	Hinged airfoil on trailing edge of wing to temporarily increase lift. Also acts as a brake.
Fuselage	The body of a plane.

Ground Speed	Speed of plane in relation to the ground.
Inclinometer	Instrument showing if plane up or down.
Jet propulsion	A form of power where the forward thrust results from the reaction to expanding gases escaping in the rear.
Payload	What is carried by the plane (equipment, people, etc.).
Rudder	Hinged airfoil on the end of plane used to turn right or left.
Runway	Strips for the landing and takeoff of planes.
Spin	When plane has lost flying speed and falls in a circular motion.
Supersonic	Faster than the speed of sound (about 750 mph).
Taxi	Moving an airplane, on the ground or in the water, under its own power.
Throttle	Lever controlling the flow of fuel to engine.
Turbulence	Moving currents of air that disturb the aircraft.

TASK 20-ART
Evaluate creativity.

AEROSPACE EDUCATION

ACHIEVEMENT AWARD

_____

has successfully completed

THE AEROSPACE EDUCATION LEARNING PACKET ON THE WRIGHT BROTHERS

Given this _____ day of _____ 19___

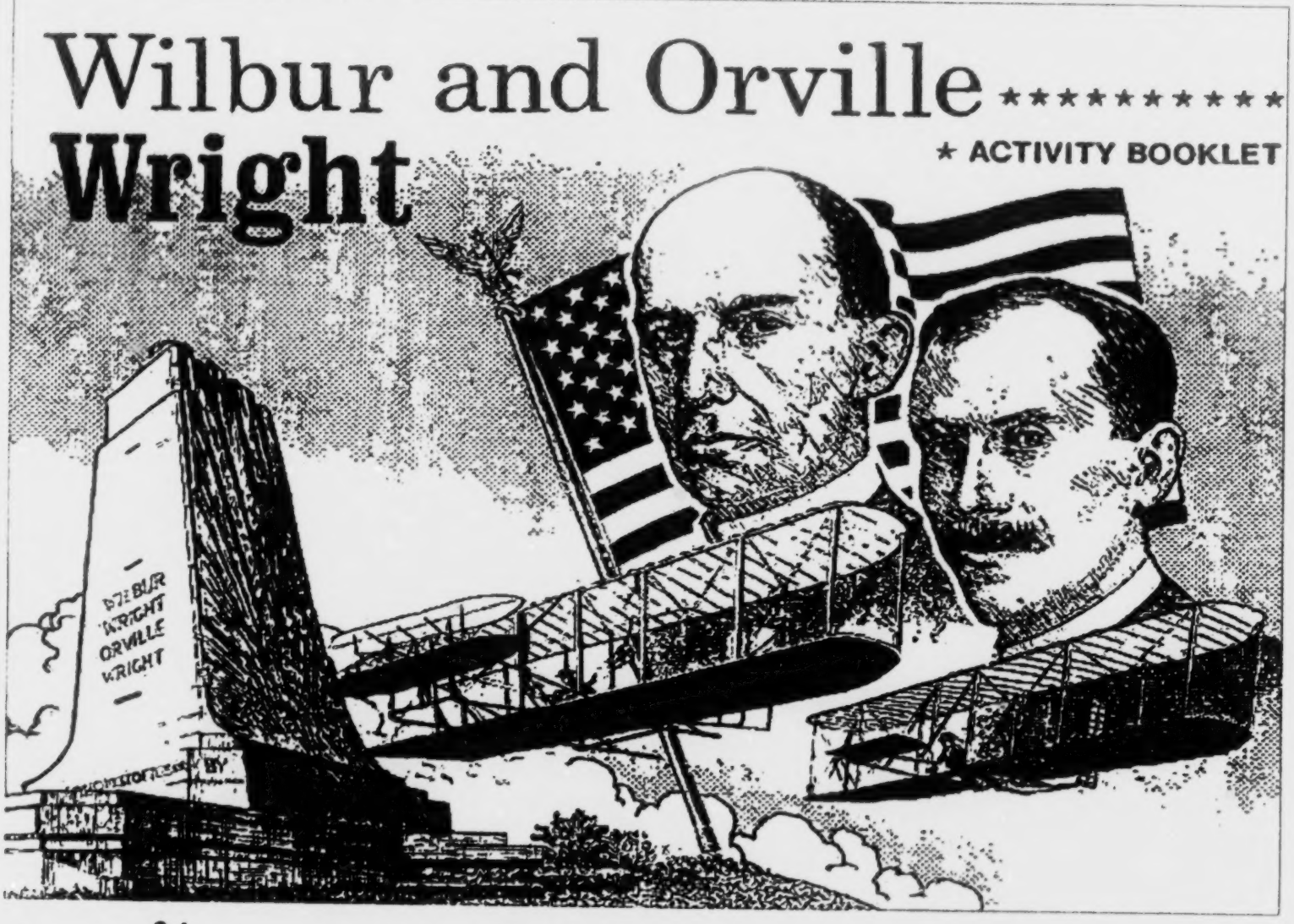
_____ _____

Teacher Principal

Wilbur and Orville Wright

★★★★★★★★★★

★ ACTIVITY BOOKLET



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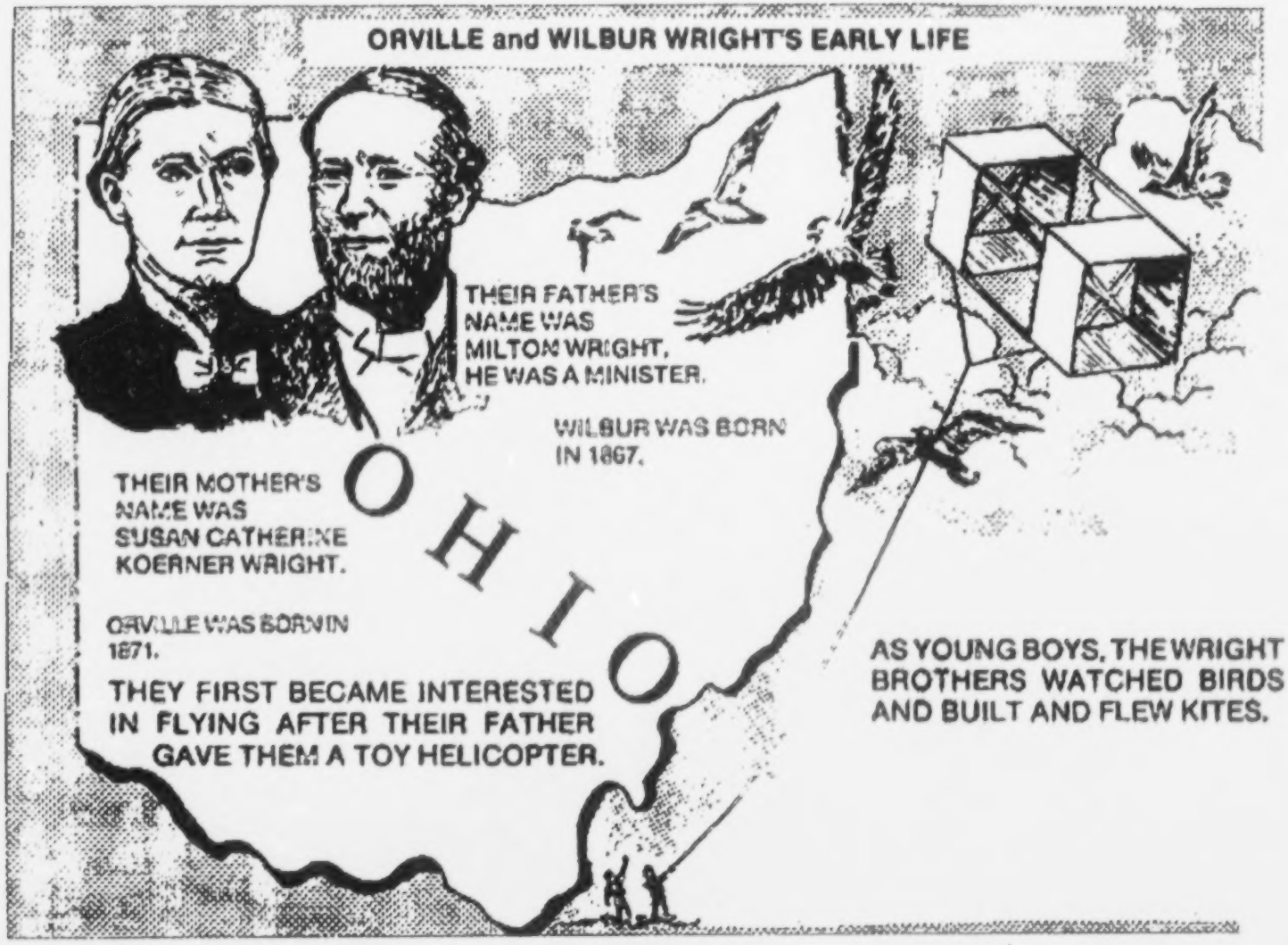
Federal Aviation Administration
800 Independence Avenue, S.W.
Washington, DC 20591
General Information: 202-366-4000
Hearing Impaired TTY (Hours 9:00am-5:30pm): 202-755-7687
http://www.faa.gov/education/index.htm


ORVILLE and WILBUR WRIGHT'S EARLY LIFE
THEIR FATHER'S NAME WAS MILTON WRIGHT. HE WAS A MINISTER.
WILBUR WAS BORN IN 1867.
THEIR MOTHER'S NAME WAS SUSAN CATHERINE KOERNER WRIGHT.
OHIO
ORVILLE WAS BORN IN 1871.
THEY FIRST BECAME INTERESTED IN FLYING AFTER THEIR FATHER GAVE THEM A TOY HELICOPTER.
AS YOUNG BOYS, THE WRIGHT BROTHERS WATCHED BIRDS AND BUILT AND FLEW KITES.

SEEK A WORD

Find the words in the puzzle that were important to the Wright brothers.

C	K	T	X	P	D	M	C	G	F	L	Q	S	Z	G
Q	H	U	L	N	W	A	Z	F	O	E	R	P	B	L
L	M	A	A	K	Q	I	E	S	A	F	N	T	K	I
T	I	Y	N	V	D	F	N	T	J	R	A	U	T	D
B	N	S	G	U	C	E	F	L	Y	E	R	C	Y	E
O	W	B	L	C	T	H	R	I	R	S	M	K	F	R
M	C	X	E	A	I	E	A	U	R	P	Y	T	A	E
A	E	F	Y	P	U	W	N	T	Q	A	C	F	J	T
X	K	T	J	D	C	G	C	H	U	E	R	I	H	N
V	M	I	X	P	D	N	E	W	S	P	A	P	E	R
P	D	L	T	C	B	L	Q	X	A	O	V	G	C	T
P	A	C	P	E	R	S	C	O	H	K	Z	E	B	H
E	Y	P	N	Q	M	B	I	C	Y	C	L	E	S	A
S	T	X	I	U	C	H	E	C	Q	A	J	M	W	O
U	O	I	C	Z	O	M	O	K	D	G	H	Z	Y	O
J	N	X	L	T	A	C	R	Z	P	A	T	E	N	T

OHIO
DAYTON
KITE
LANGLEY
CHANUTE
FLYER
FRANCE
ARMY
BICYCLES
GLIDER
NEWSPAPER
PATENT

THE WRIGHT BROTHERS GROW UP

ORVILLE AND WILBUR WRIGHT BOTH FINISHED HIGH SCHOOL. NEITHER OF THEM WENT TO COLLEGE.

ORVILLE BUILT HIS OWN PRINTING PRESS WHILE HE WAS IN HIGH SCHOOL. WILBUR JOINED ORVILLE AND PRINTED A NEWSPAPER.

THE BROTHERS BEGAN RACING AND REPAIRING BICYCLES.

MATH TREASURE HUNT

Follow the directions to find the answer to the Treasure Question - How long did the Wright Flyer stay in the air on its first flight?

WRITE THE NUMERALS

(1) The year of the first flight

ADD

(2) The number of letters of the town where that flight took place.

SUBTRACT

(3) The year Wilbur was born.

DIVIDE BY

(4) Five

MULTIPLY BY

(5) The number of words in the state where the first flight took place.

ADD

(6) The day of the month of the first flight.

MULTIPLY BY

(7) The number of letters in the first name of the oldest brother.

SUBTRACT

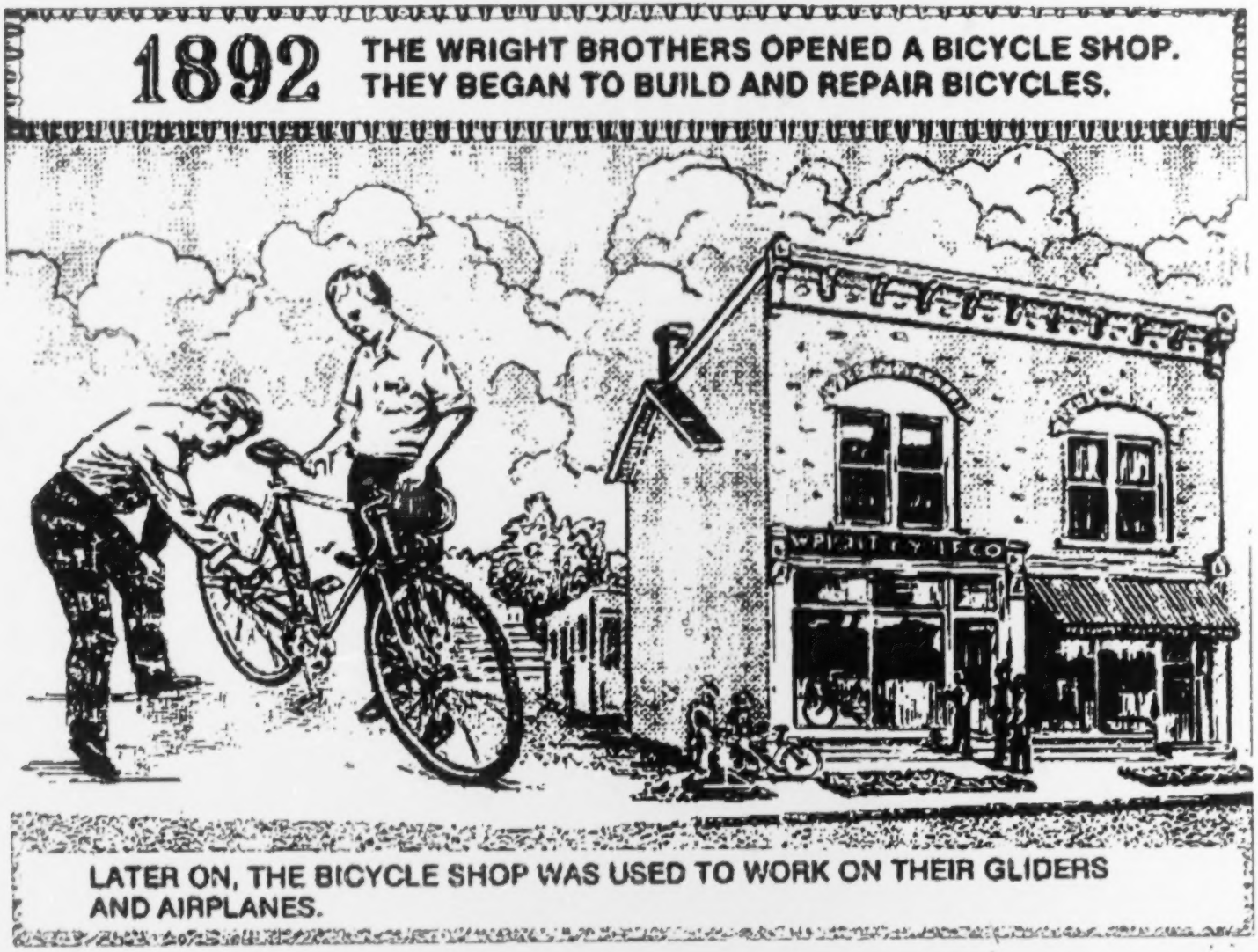
(8) The number that stands for bicentennial

ADD

(9) The number of wings on the Flyer

DO YOUR WORK HERE!

ANSWER: _____seconds


1892
THE WRIGHT BROTHERS OPENED A BICYCLE SHOP.
THEY BEGAN TO BUILD AND REPAIR BICYCLES.
LATER ON, THE BICYCLE SHOP WAS USED TO WORK ON THEIR GLIDERS
AND AIRPLANES.

How many words can you make from WILBUR and ORVILLE WRIGHT?

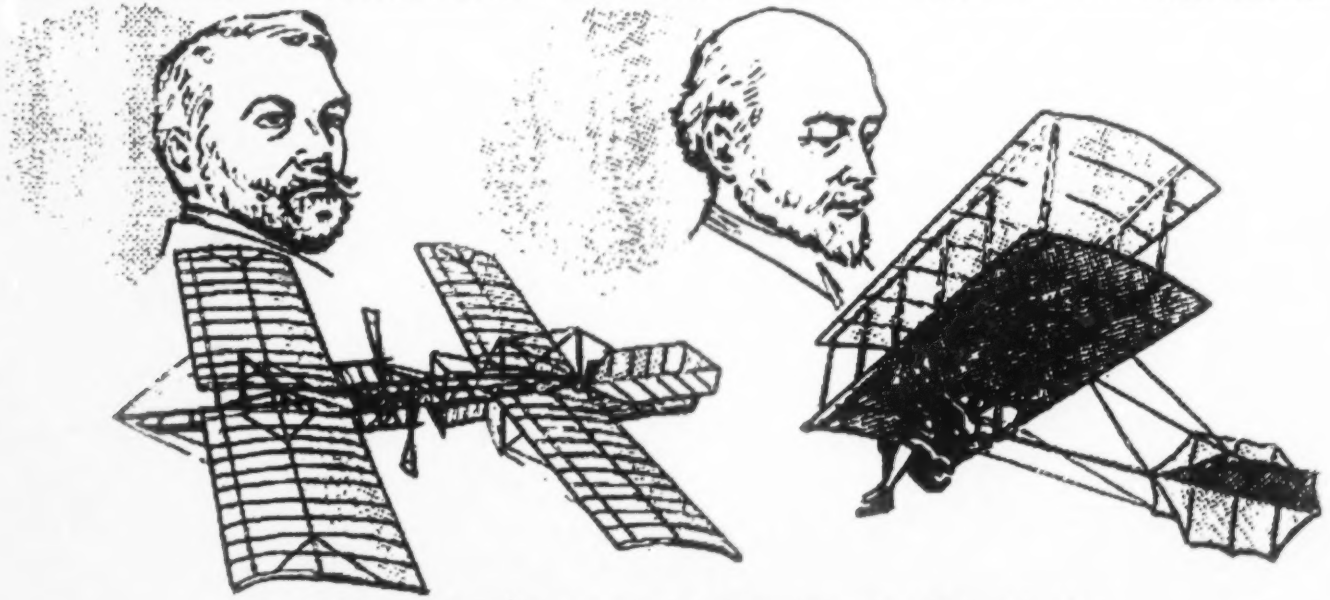
Nouns (naming words)	Verbs (doing words)	Adjectives & Adverbs (describing words)

1899

THE WRIGHT BROTHERS DECIDED TO STUDY FLYING.

THEY RECEIVED INFORMATION WRITTEN BY...

Samuel Pierpont Langley and Octave Chanute



AFTER READING ALL THEY COULD FIND ABOUT FLIGHT, THE WRIGHT BROTHERS DECIDED TO BUILD A GLIDER.

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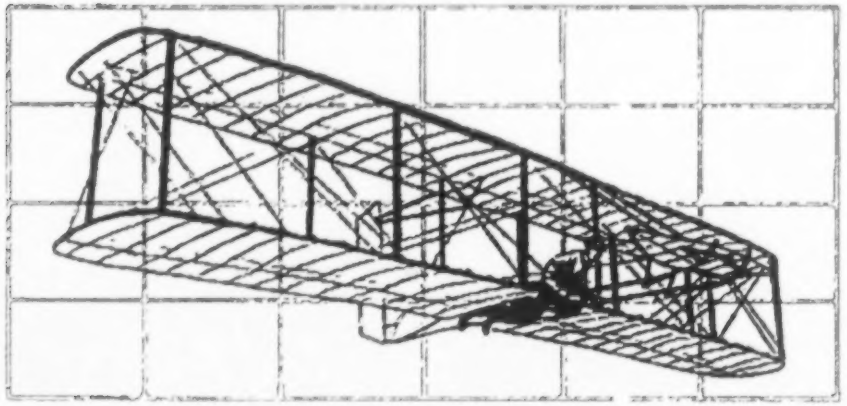
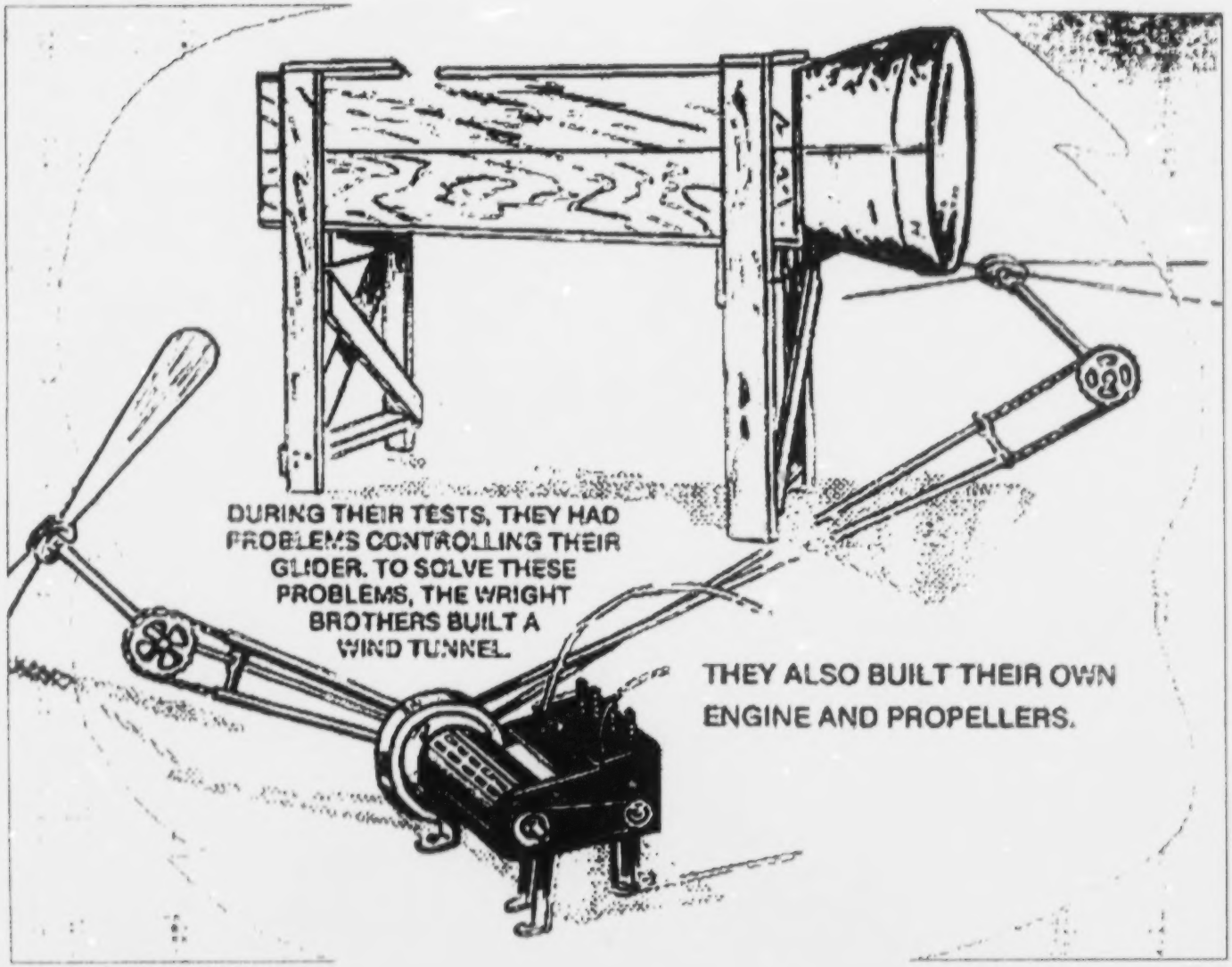
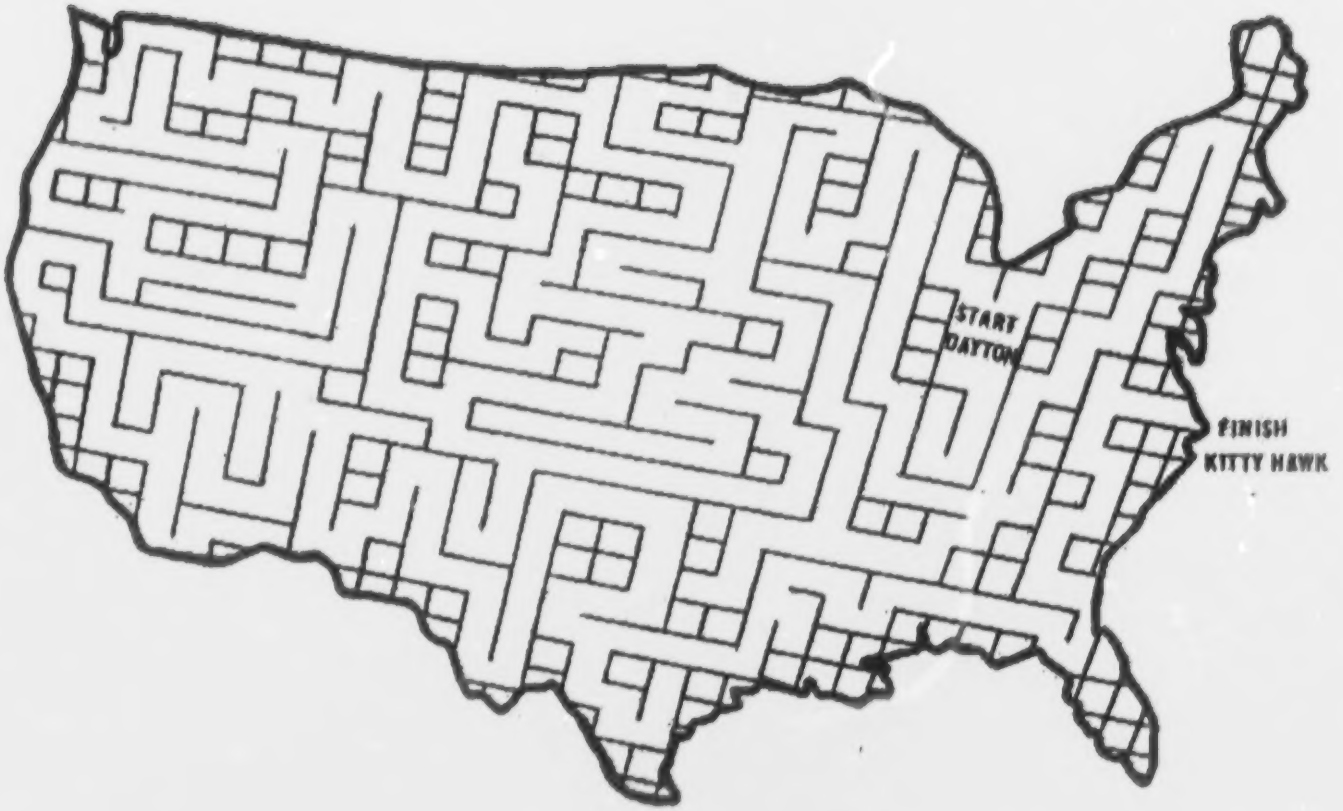
COPY THE WRIGHT GLIDER

Use the blank grid to draw your own Wright glider.

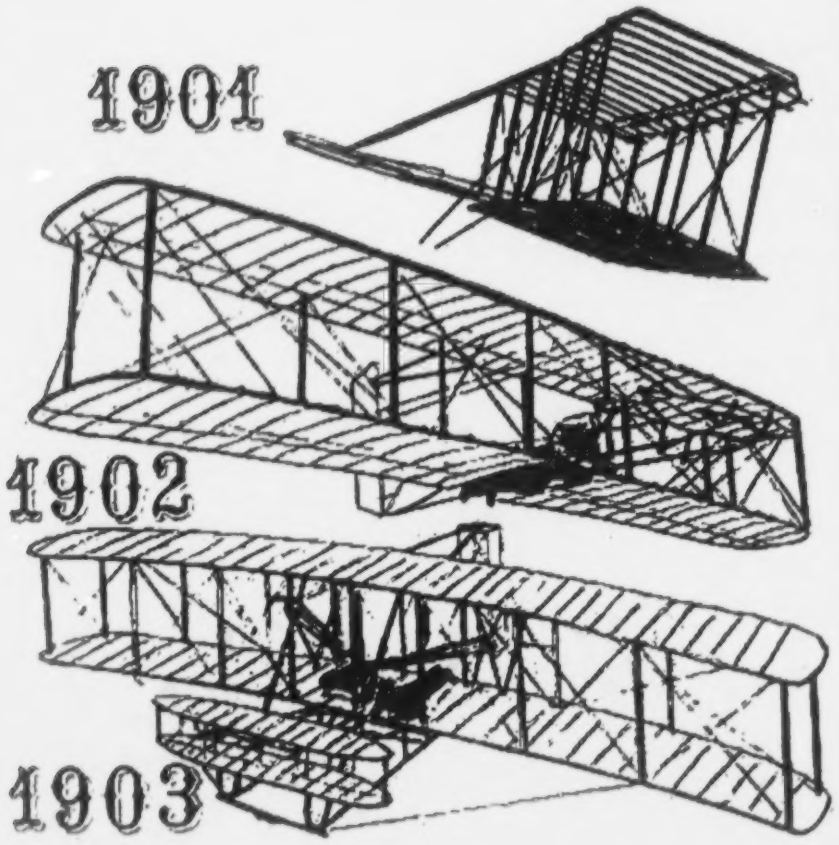



DURING THEIR TESTS, THEY HAD PROBLEMS CONTROLLING THEIR GLIDER. TO SOLVE THESE PROBLEMS, THE WRIGHT BROTHERS BUILT A WIND TUNNEL.
THEY ALSO BUILT THEIR OWN ENGINE AND PROPELLERS.

HELP THE WRIGHT BROTHERS FIND THEIR WAY TO KITTY HAWK



THEY NEEDED A PLACE WHERE THE WIND WAS STRONG AND STEADY TO TEST THEIR GLIDER. THE WEATHER BUREAU SUGGESTED THE SAND DUNES AROUND KITTY HAWK, NORTH CAROLINA.



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MAKE A WORD

Add and subtract letters to discover important things and people in the Wright brothers' work in aviation.

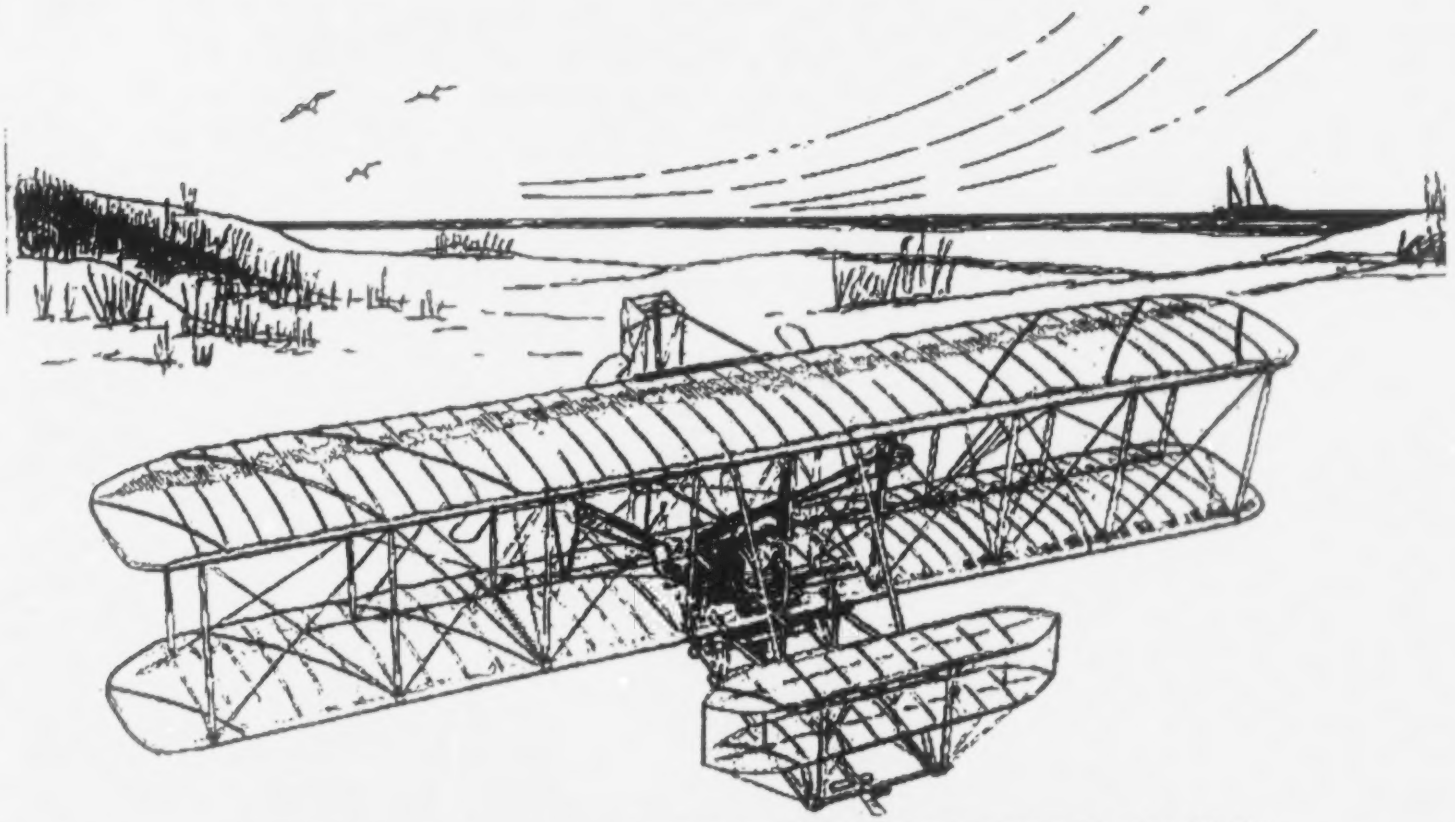
1. window - ow tundra - dra + nellie - lie = _____

2. October - ober + a + vent - nt Chanel - el + u + ten - n = _____

3. biology - ology + cycling - ing + e cream - eam + maze - m = _____

4. grass - r - s + oh - h + line english - lish + marine - mar = _____

5. pow wow - wow + ere + deed - eed fly - y + mighty - m - y = _____



IN THE WINTER OF 1903, THE WRIGHT BROTHERS RETURNED TO NORTH CAROLINA WITH THEIR AIRPLANE WHICH THEY NAMED THE *FLYER*.

The 1903 Wright *Flyer*

ON DECEMBER 17, 1903, THE *FLYER* FLEW SUCCESSFULLY.
THIS WAS THE FIRST CONTROLLED POWERED FLIGHT OF A HEAVIER-THAN-AIR AIRPLANE IN HISTORY.

THE WRIGHT FLYER CROSSWORD PUZZLE

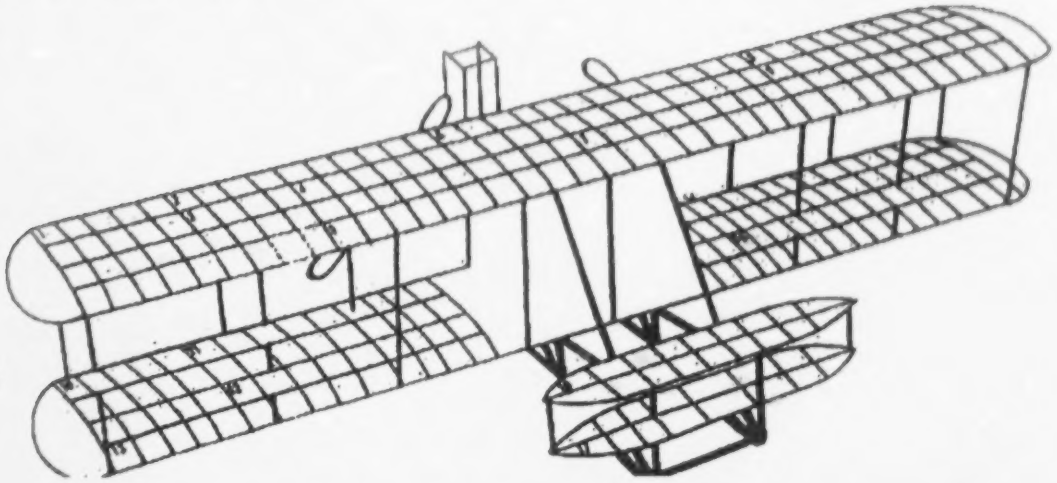
ACROSS

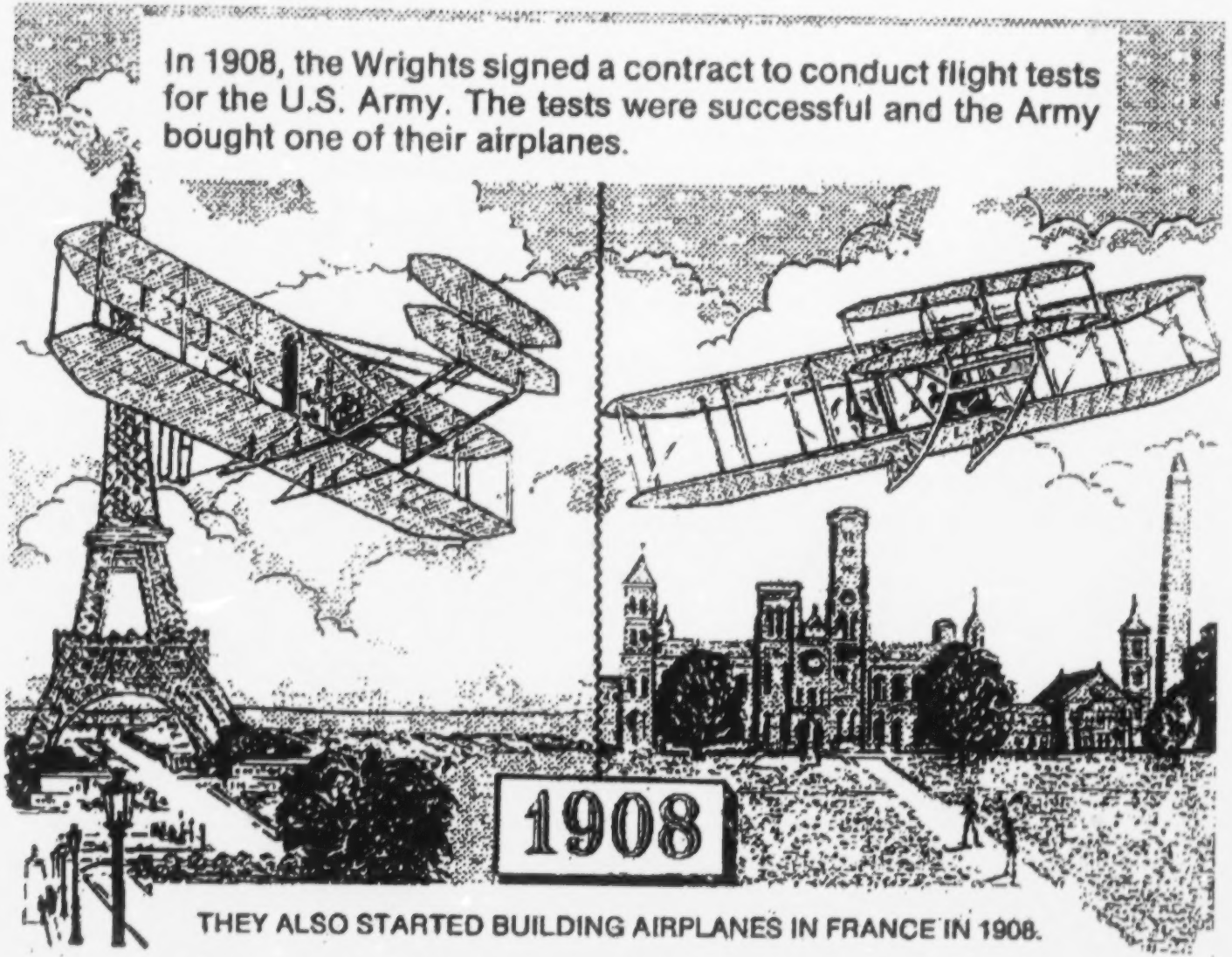
1. The last name of Wilbur.
3. Another word for breezy.
5. A famous museum in Washington, DC.
6. The brother of Wilbur.
7. Another word for creation or discovery.
9. _____ Carolina.
10. The month in which the first controlled powered flight of a heavier-than-air airplane took place.
12. Go fly a _____
13. Paris, _____
14. The season the first controlled powered flight of a heavier-than-air airplane took place.
15. The state where Kitty Hawk is located.
16. Samuel Pierpont _____
17. Octave _____

Down

2. One, _____ three, etc.
4. Opposite of no.
6. Dayton, _____
7. Opposite of out.
8. Another name for a hotel, motel, or lodge.
11. Another name for a bicycle.
14. The lifting part of an airplane.

ANSWERS ON PAGE 20.



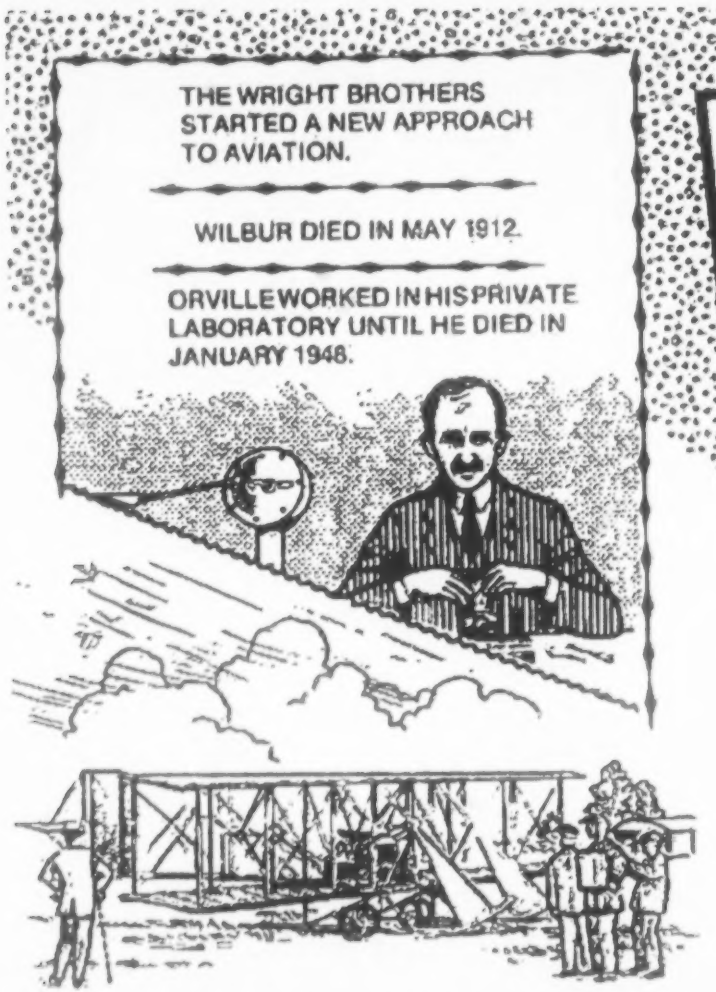

In 1908, the Wrights signed a contract to conduct flight tests for the U.S. Army. The tests were successful and the Army bought one of their airplanes.
1908
THEY ALSO STARTED BUILDING AIRPLANES IN FRANCE IN 1908.

NUMBER CHALLENGE

Using important dates in the Wright brother's lives, reorganize each number to make the highest number you can.

1903 _____
1917 _____
1915 _____
1909 _____
1910 _____
1908 _____
1907 _____

For added fun, add them all up. Now what is the total number? _____
Can you write it in words? _____

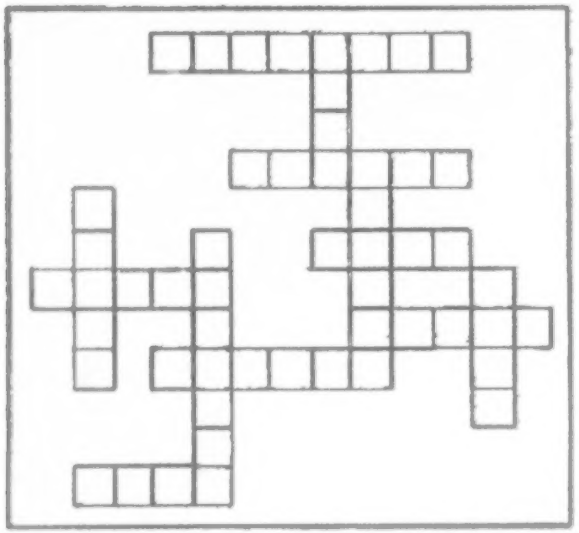

THE WRIGHT BROTHERS STARTED A NEW APPROACH TO AVIATION.
WILBUR DIED IN MAY 1912.
ORVILLE WORKED IN HIS PRIVATE LABORATORY UNTIL HE DIED IN JANUARY 1948.

WRIGHTS' 1909 IMPROVED VERSION HAD A 30-HORSEPOWER ENGINE.

POSTER SHOWING THE FIRST INTERNATIONAL AVIATION MEET IN THE UNITED STATES.

WRIGHTS' MEMORIAL

Fill in the puzzle with the things shown in the picture.

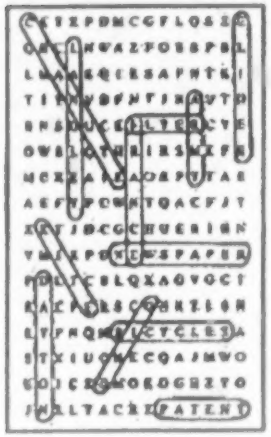


ORVILLE EAGLE KITE HANGAR CLOUD MONUMENT

WILBUR WING FLAG GLIDER MOTOR MOON

ANSWERS TO ACTIVITIES

Pg. 2 SEEK A WORD



Pg. 4 MATH TREASURE HUNT

1903 + 9 (Kitty Hawk) = 1912 – 1867 = 45 ÷ 5 = 9 x 2 (North Carolina) = 18 + 17 = 35 x 6 (Wilbur) = 210 – 200 = 10 ÷ 2 = 12

Answer — 12 Seconds

Pg. 10 HELP THE WRIGHT BROTHERS FIND THEIR WAY TO KITTY HAWK

Pg. 12 MAKE A WORD

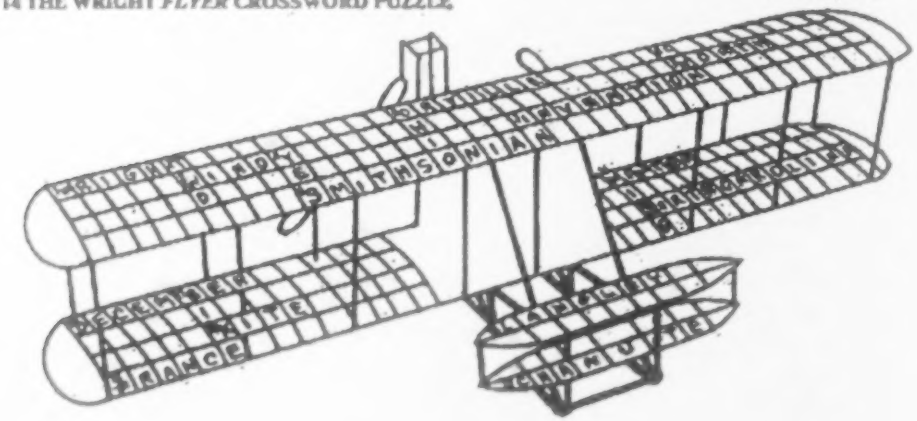
1) wind tunnel 2) Octave Chanute 3) bicycle craze 4) gasoline engine 5) powered flight

Pg. 16 NUMBER CHALLENGE

9310, 9711, 9511, 9910, 9110, 9810, 9710

Total = 67,072 — sixty-seven thousand and seventy-two

Pg. 14 THE WRIGHT *FLYER* CROSSWORD PUZZLE



Pg. 18 WRIGHTS' MEMORIAL